

Date: Friday, 11/04/2008 9:02:22 AM
User: Julie Lecocq

Process Sheet

Customer :	CU-DAR001 Dart Helicopters Services	Drawing Name :	BLADE
Job Number :	38558		
Estimate Number :	10327		
P.O. Number :		Part Number :	D2741
This Issue :	11/04/2008	Drawing Number :	D2741 REV C
Prsht Rev. :	NC	Project Number :	N/A
First Issue :	//	Drawing Revision :	C
Previous Run :	36343	Material :	
Written By :		Due Date :	10/05/2008
Checked & Approved By :	JD 08.4.11 Comment : Est Rev: D 00.11.15 Removed P/O turning - in house process EC Est Rev: E 06-03-20 As Per Rev C JLM Est Rev: F 06.04.20 Added grinding after heat treating EC		
Qty:	40	Um:	Each

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	M4130NB0500X03000	4130 Bar 0.5 x 3.0"
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(40)

Comment: Qty.: 1.2118 f(s)/Unit Total: 48.4722 f(s)

4130 BAR 0.5 x 3.0"

Material: 4130 steel bar 0.50" x 3.00"

Batch: 106752 → 42'
 106274 → 6' 4722'
 M.A 08/04/13

2.0	BAND SAW	BAND SAW
-----	----------	----------



(40)

Comment: BAND SAW

Cut blanks 13.850" long +0.063" -0.000"

M.A 08/04/13

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
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(P10) →

Comment: HAAS CNC VERTICAL MACHINING #1

1-Machine per folio FA108

M.A / EC 08/04/13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D2741 PAR #: N/A Fault Category: Prod / Machine NCR: Yes No DQA: D Date: 08/06/04
 QA: N/C Closed: D Date: 08/06/05

NCR: <u>38558</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A -	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08/01/14	30	one part is 0.007" under tol. in width. Dim suspected to be 2.930 ± 0.006 RC origin was set wrong by operator	<u>PL</u> <u>08/04/14</u>	Part is acceptable Re D/S. Email Qty <u>(+1)</u>	<u>M.A</u> <u>08/04/14</u>	<u>S</u> <u>08/04/14</u>	<u>PL</u> <u>08/04/14</u>	<u>C</u> <u>08/04/14</u>

NOTE: Date & initial all entries

Date: Friday, 11/04/2008 9:02:22 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: BLADE

Job Number: 38558

Part Number: D2741

Job Number:



Seq. #:	Machine Or Operation:	Description :
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4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
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Comment: INSPECT PARTS AS THEY COME OFF MACHINE

M.A/ 08/04/13

5.0	QC8	SECOND CHECK
-----	-----	--------------



Comment: SECOND CHECK

SA 08/04/16

6.0	SMALL FAB 1	SMALL & MEDIUM FAB RESOURCE 1
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Comment: SMALL & MEDIUM FAB RESOURCE 1

1-Deburr

2-Bend per Dwg D2741

→ EB 08/04/22 (40)

21 08/04/22

SB 08/04/17

7.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

5 08/04/23 (40)

8.0	OUTSIDE SERV.30	OUTSIDE SERVICES-MACH
-----	-----------------	-----------------------



Comment: Sub-Contracting PURCHASING

Issue P/O: 6218

Harden material as per Dwg D2741

Min. Ultimate Tensile Strength = 152 ksi (34-40 HRC)

Min. Yield Tensile Strength = 141 ksi

Test report or Certification required

CL 08/04/24 (40)

9.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: PACKAGING RESOURCE #1

Receive and Inspect for transit damage

Ensure Test report or Certification attached

CL 08/05/28 (40)

10.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

5 08/05/28 (40)

11.0	SMALL FAB 1	SMALL & MEDIUM FAB RESOURCE 1
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Comment: SMALL & MEDIUM FAB RESOURCE 1

1-Pass in deburring machine

2-Grind off edges

AB 8-5-28

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 11/04/2008 9:02:22 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: BLADE

Job Number: 38558

Part Number: D2741

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

POWDER COATING

POWDER COATING



M107892

start: 11:20



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.2) as per QSI 005 4.3

Temp: 900°

Finish: 11:50

FL 08/05/29

13.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

BL 08-05-29

(40)

14.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location:

ST. 466

AS 08/06/02 (X40)

15.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/06/03

Job Completion



n 08-06-03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

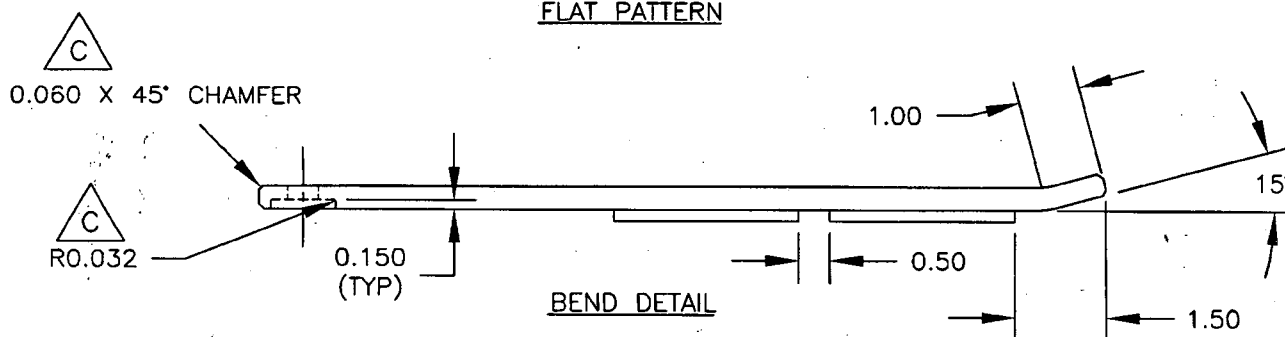
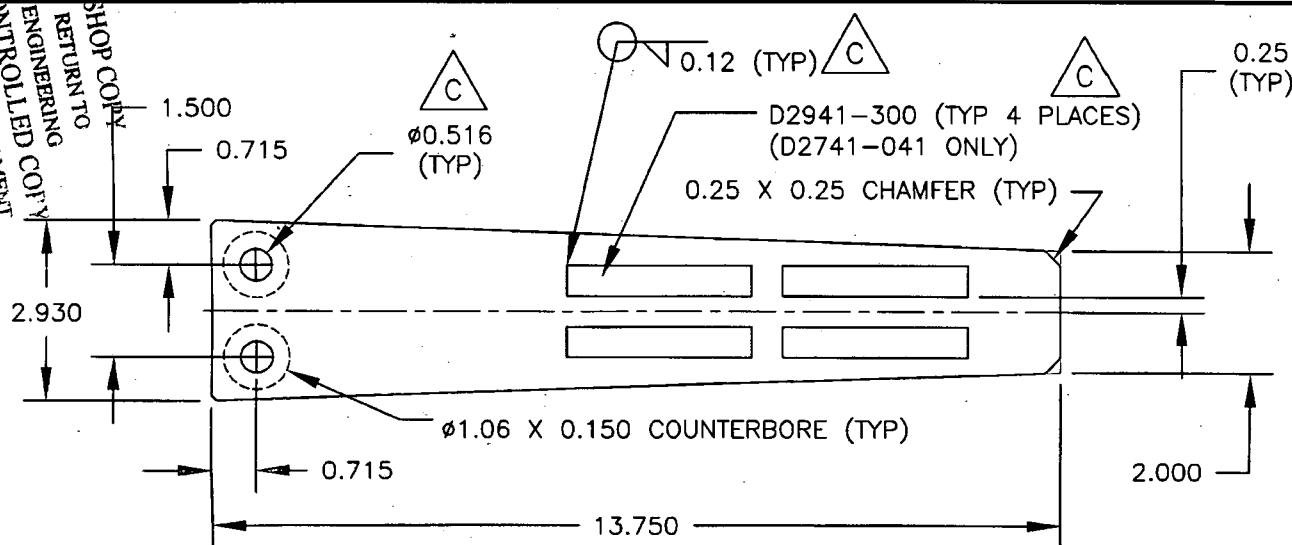
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART

RELEASED
06 02 07 11

DESIGN	DRAWN BY	DART AEROSPACE USA, INC.	
04	04	PORT HADLOCK, WA	
CHECKED	APPROVED	DRAWING NO.	REV. C
06.01.12		D2741	SHEET 1 OF 1
DATE		TITLE	SCALE
06.01.12		BLADE	1:3
A	98.04.16	NEW ISSUE	
B	98.09.01	CHANGE C'SINK TO C'BORE	
C	06.01.12	LARGER HOLE, ADD RADIUS AND CHAMFER ADD -041/-043 OPTIONS	



D2741 BLADE

- 1) MATERIAL: AISI 4130 STEEL 0.375 THICK
MIN. ULTIMATE TENSILE STRENGTH = 152 ksi (34-40 HRC)
MIN. YIELD TENSILE STRENGTH = 141 ksi
- 2) FINISH: POWDER COAT WHITE (REF. 4.3.5.2) PER DART QSI 005 4.3
- 3) ALL DIMENSIONS ARE IN INCHES
- 4) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 5) BREAK ALL SHARP EDGES 0.030 TO 0.060
- 6) TO MAKE D2741-041, WELD D2941-300 (4) AS SHOWN ABOVE.
REMOVE POWDER COAT FROM SURFACE OF D2941-300
- 7) TO MAKE D2741-043, WELD 7560 HARDCOAT ROD INSTEAD OF D2941-300

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WORK ORDER

WITHOUT NOTICE
UNCONTROLLED COPY
SUBJECT TO AMENDMENT

NO 06558

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 38558
Description: BLADE		Part Number: D2741
Inspection Dwg: D2741 Rev: C		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☐ First Article ☐ Prototype

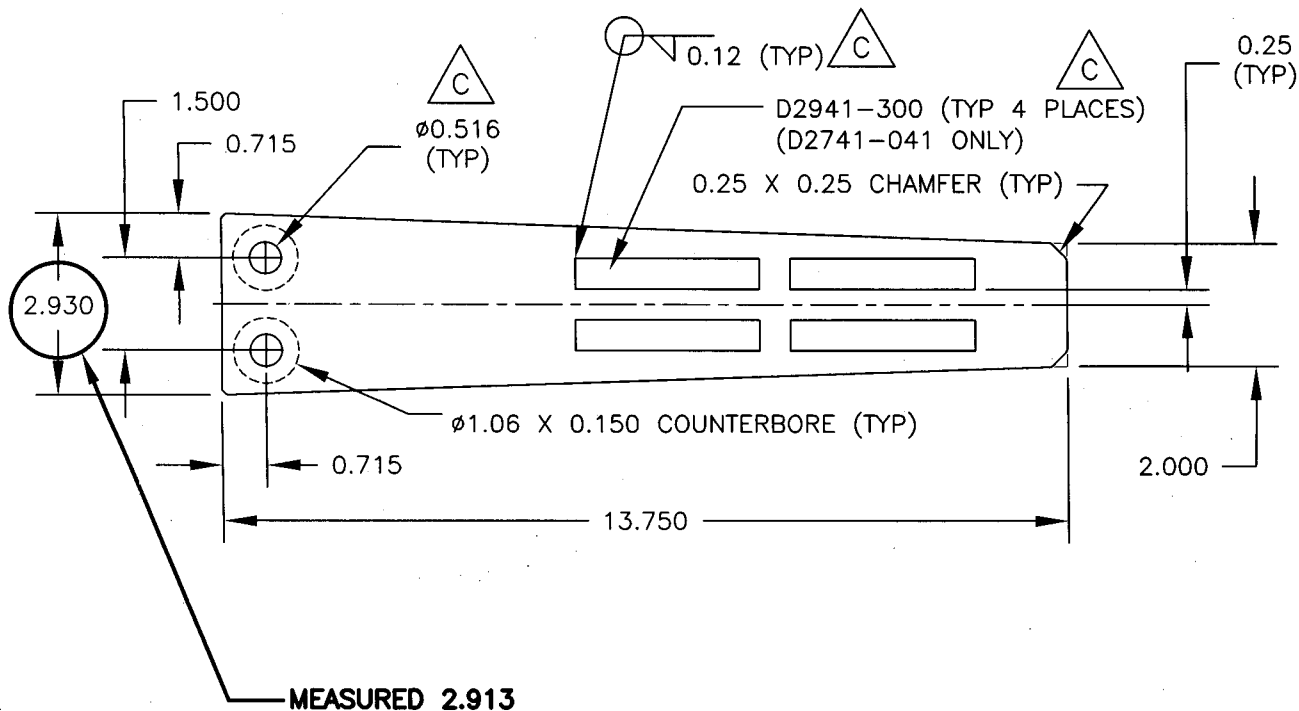
Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
2.930	+/- .010	2.930	✓			
2.000	+/- .010	2.000	✓			
0.715	+/- .010	0.715	✓			
0.715	+/- .010	0.715	✓			
1.500	+/- .010	1.500	✓			
13.750	+/- .010	13.750	✓			
0.25 x 0.25	+/- .030	0.25 x 0.25	✓			
0.150	+/- .010	0.151	✓			
0.060 x 45°	+/- .010	0.056 x 45°	✓			
R 0.032	+/- .010	R 0.032	✓			
Ø 1.06 x 0.150	+/- .030	Ø 1.049 x 0.151	✓			
Ø 0.516	+0.008 / -0.001	Ø 0.518	✓			
0.375	+/- .010	0.370	✓			Checked DST
1.50	+/- .030					welder
0.250	+/- .030					welder
0.12	+/- .030					welder
0.50	+/- .030					welder
1.00	+/- .030					bender
15°	+/- 1/2°					bender

Measured by: M.A. /
Date: 08/04/13

Audited by: SA
Date: 08/04/13

Prototype Approval:
Date:

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/RF	



D2741 BLADE

- MATERIAL: AISI 4130 STEEL 0.375 THICK
MIN. ULTIMATE TENSILE STRENGTH = 152 ksi (34-40 HRC)
MIN. YIELD TENSILE STRENGTH = 141 ksi
- FINISH: POWDER COAT WHITE (REF. 4.3.5.2) PER DART QSI 005 4.3
- ALL DIMENSIONS ARE IN INCHES
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- BREAK ALL SHARP EDGES 0.030 TO 0.060
- TO MAKE D2741-041, WELD D2941-300 (4) AS SHOWN ABOVE.
REMOVE POWDER COAT FROM SURFACE OF D2941-300
- TO MAKE D2741-043, WELD 7560 HARDCOAT ROD INSTEAD OF D2941-300

DESIGN	DRAWN BY	DART AEROSPACE USA, INC.
CHECKED	APPROVED	PORT HADLOCK, WA
DATE	TITLE	REV. C
06.01.12	BLADE	SHEET 1 OF 1
A	98.04.16	NEW ISSUE
B	98.09.01	CHANGE C'SINK TO C'BORE
C	06.01.12	LARGER HOLE, ADD RADIUS AND CHAMFER ADD -041/-043 OPTIONS
SCALE		1:3

Peter Hum

From: David Shepherd [dshepherd@dartaero.com]
Sent: April 14, 2008 10:48 AM
To: 'Peter Hum'
Subject: RE: D2741 Blade

Peter,

My gut tells me that this deviation is acceptable.

David

From: Peter Hum [mailto:phum@dartaero.com]
Sent: Monday, April 14, 2008 7:35 AM
To: 'David Shepherd'
Subject: D2741 Blade

David,

Manufacturing is making a D2741 Blade (goes on D350-636).

The nominal dimension on the width of the blade is 2.930". However, the measured dimension is 2.913". See the attached sketch.

This was caused by the operator not setting the origin correctly.

I am not sure how to handle this one because there is no Stress Report for this part. The Stress Report indicates that this part has identical dimensions to the OEM blade. The hole spacing of 1.500" is okay, I don't expect any fit problems.

Is this deviation acceptable?

Thanks
Peter

No virus found in this incoming message.

Checked by AVG.

Version: 7.5.519 / Virus Database: 269.22.13/1376 - Release Date: 4/13/2008 1:45 PM

No virus found in this outgoing message.

Checked by AVG.

Version: 7.5.519 / Virus Database: 269.22.13/1376 - Release Date: 4/13/2008 1:45 PM

14/04/2008



VAC AERO
INTERNATIONAL INC.

PACKING SLIP

OAK 98200-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



QUEBEC DIVISION
7450 RUE VERITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

GST No.: R105468102

05/22/2008

MM / DD / YYYY

PAGE: 1

1DAR01

BILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
05/21/2008		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO 00006216		COD

LN	PART NO	DESCRIPTION	UOM	QTY ORDERED	QTY SHIPPED	B/O QTY
01	D2741	BLADE / <i>C208/05/28</i> Process Specifications: Procedure: 4161 HARDENED TO 152 KSI MINIMUM PER P.O. INSTRUCTIONS 100% HARDNESS TESTED PER ASTM E-18: HRC 34-40 MATERIAL: 4130 B38558 P/S# 214607	EA	40	40	0
02	MC	MINIMUM CHARGE 140 LBS @ \$2.35/LB		1	1	0

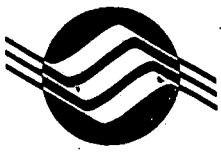
No claims for shortage in weight or count will be entertained, unless presented within 5 working days after receipt of materials by customer.



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TURBINE COMPONENT OVERHAUL · PLASMA AND OTHER COATINGS



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VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No.: R105468102

OAK 98200-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION
7450 RUE VERITE STREET, ST. LAURENT, QUEBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

05/21/2008

MM / DD / YYYY

PAGE: 1

BILL TO:

1DAR01
DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
05/21/2008		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO 00006216		COD

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D2741	BLADE	EA	40	40	
Process Specifications: Procedure: 4161 HARDENED TO 152 KSI MINIMUM PER P.O. INSTRUCTIONS 100% HARDNESS TESTED PER ASTM E-18: HRC 34-40 MATERIAL: 4130					
B38558					
P/S# 214607					

100% HARDNESS TESTED

Qty: 40 Pcs
36/37 HRC 22004/08



I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

Authorized Q.C. Inspector



VACUUM BRAZING · HEAT TREATING · SPECIAL PROCESSING · FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL · PLASMA AND OTHER COATINGS



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